Patent Claims

Sub B2

1. A computer for analyzing data from nuclear magnetic resonance, whereby the data contains at least one relaxation signal of a sample, **characterized in that** the computer operates with at least one analyzing means that separates the data into at least two parts that are differently dependent on an echo time T_E.

2. The computer according to Claim 1, **characterized in that** the analyzing means separates the data into at least one part that is dependent on an echo time T_E and into at least one more component that is not dependent on the echo time T_E and whereby the analyzing means acquires the signals that are dependent on an echo time T_E as activation signals.

Sub A1

3. A nuclear magnetic resonance tomograph **characterized in** ~~that it comprises at~~ least one ~~computer according~~ to one of Claims 1 or 2.

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4. A method to analyze data from nuclear magnetic resonance, whereby at least one relaxation signal of a sample is detected, **characterized in that** the data is separated into at least two parts having a different dependence on an echo time T_E.

5. The method according to Claim 4, **characterized in that** the intensity values of the measured data are acquired and separated into at least two different dependencies on the echo time T_E.

6. The method according to Claim 5, **characterized in that** a measure of a statistical variation of the intensities is determined.

7. The method according to Claim 6, **characterized in that** a standard deviation of the intensities is ascertained.

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8. The method according to one of Claims 4 through 7, **characterized in that** ~~the~~ relaxation signal is divided into at least one part that is dependent ~~on the~~ echo time T_E and into at least one part that is not dependent ~~on the~~ echo time T_E.

9. The method according to one of Claims 4 through 8, **characterized in that** at ~~least~~ one signal is determined that is proportional to $T_E \exp(-T_E / T_2^*)$.

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10. The method according to Claim 9, **characterized in that** T_2^* is ascertained with the formula $S = S_0 \exp(-T_E / T_2^*) \cancel{+ g}$.

Sub A3

11. The method according to one or more of Claims 4 through 10, ~~**characterized in that statistical fluctuations**~~ of ΔT_2^* are ascertained.

Sub B

12. The method according to Claim 11, **characterized in that** a standard deviation $\sigma(\Delta T_2^*)$ is ascertained.

13. The method according to Claim 12, **characterized in that** a quotient $\sigma(\Delta T_2^*) / T_2^*$ is formed and acquired as a measure of an activity.

Sub A4

14. The method according to one of Claims 4 through 13, ~~**characterized in that** a statistical deviation of~~ an initial intensity S_0 is ascertained.

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15. The method according to Claim 14, **characterized in that** a standard deviation $\sigma(\Delta S_0)$ is ascertained.

16. The method according to Claim 15, **characterized in that** a quotient $\sigma(\Delta S_0) / \Delta S_0$ is ascertained.

Sub A5

17. The method according to one of Claims 4 through 16, characterized in that a statistical fluctuation of a noise signal g is ascertained.

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18. The method according to Claim 17, characterized in that a standard deviation $\sigma(g)$ of g is formed.

Sub A6

19. The method according to one of Claims 4 through 18, characterized in that the recorded data is acquired in an at least two-dimensional field, whereby a field axis (DTE) acquires echo times T_E and whereby another field axis (DTR) reproduces repetitions of excitations at a time interval T_R.

Sub B8

20. The method according to Claim 19, characterized in that $\sigma(\Delta T_2^*)$ and $\sigma(g)$ are determined by means of the following steps:

(i) adaptation of signals averaged over DTR to an exponential decay as a function of DTE and determination of S_0 and T_2^*;

(ii) calculation of $\sigma(\Delta S_0)$, $\sigma(\Delta T_2^*)$ and $\sigma(g)$ for several voxels and different T_E, followed by averaging of these values over at least one region of interest (ROI);

(iii) adaptation of

$$\frac{\sigma(\Delta S)}{S_0}=\left\{\left[\left(\frac{T_E}{T_2^*}\right)^2\left(\frac{\sigma(\Delta T_2^*)}{T_2^*}\right)^2+\left(\frac{\sigma(\Delta S_0)}{S_0}\right)^2-2\frac{T_E}{T_2^*}\frac{\langle\Delta S_0\,\Delta T_2^*\rangle}{S_0\,T_2^*}\right]e^{-2T_E/T_2^*}+\left(\frac{\sigma(g)}{S_0}\right)^2\right\}^{1/2}$$

and determination of $\sigma(\Delta S)/S_0$ as a function of T_E.

21. The method according to Claim 20, characterized in that the expression $\langle\Delta S_0 \Delta T_2^*\rangle = 0$ is used for the adaptation of $\sigma(\Delta S_0)/S_0$.